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B70 03093

SUBJECT: Comparison of Skylab IIP's for Inclinations of 45, 47 and 50 Degrees - Case 610

DATE: March 31, 1970

FROM: W. L. Austin

MEMORANDUM FOR FILE

A recent analysis (Reference 1) has shown that the instantaneous impact point (IIP) curve of the Saturn IB launch vehicle will traverse Europe near the end of the S-IVB burn. A European impact could only occur in the event of an early shutdown of the S-IVB. Whether or not a Skylab launch trajectory with such IIP characteristics is acceptable has not yet been decided. The purpose of this memorandum is to display IIP characteristics of Skylab launch trajectories into orbits of 45 and 47 degree inclinations and to compare them with the 50 degree launch trajectory.

Figure 1 shows the IIP curves for S-IB in-plane (no yaw maneuver) launch trajectories into orbits of 45, 47 and 50 degree inclinations. These curves were generated by computing a conic no-drag trajectory at each integration step in the integrated trajectory. The point of impact is the first intersection of the conic ellipse with a spherical earth after apogee passage. The small triangle indicates the impact points spaced at intervals of one second for integer numbers of seconds from launch.

Referring to Figure 1, the times (during the S-IVB burn) the IIP's begin to cross over or exit major land masses are shown for each of the curves. The crossover times for islands (47 degree inclination) and the southwestern tip of Turkey (50 degree inclination) are omitted because of their extremely short durations. Because of insufficient data, that portion of the 45 degree inclination curve which passes over South Yemen is not included. However, it should not exceed 0.3 seconds.

The S-IVB IIP dwell times over Europe and the Mid-East are 5.3, 1.8 and 4.2 seconds for the 50, 47 and 45 degree inclinations respectively. Should the 50 degree inclination orbit not be acceptable because of the S-IVB IIP characteristics, the 47 degree inclination offers a substantial decrease in the S-IVB dwell time over major land masses.

1025-WLA

Attachment

REFERENCE

Comparison of AAP-2 Launch Windows and Launch Opportunities with the SWS at 35 and 50 Degree Inclinations - Case 610, Bellcomm Memorandum for File, W. L. Austin, February 10, 1970.

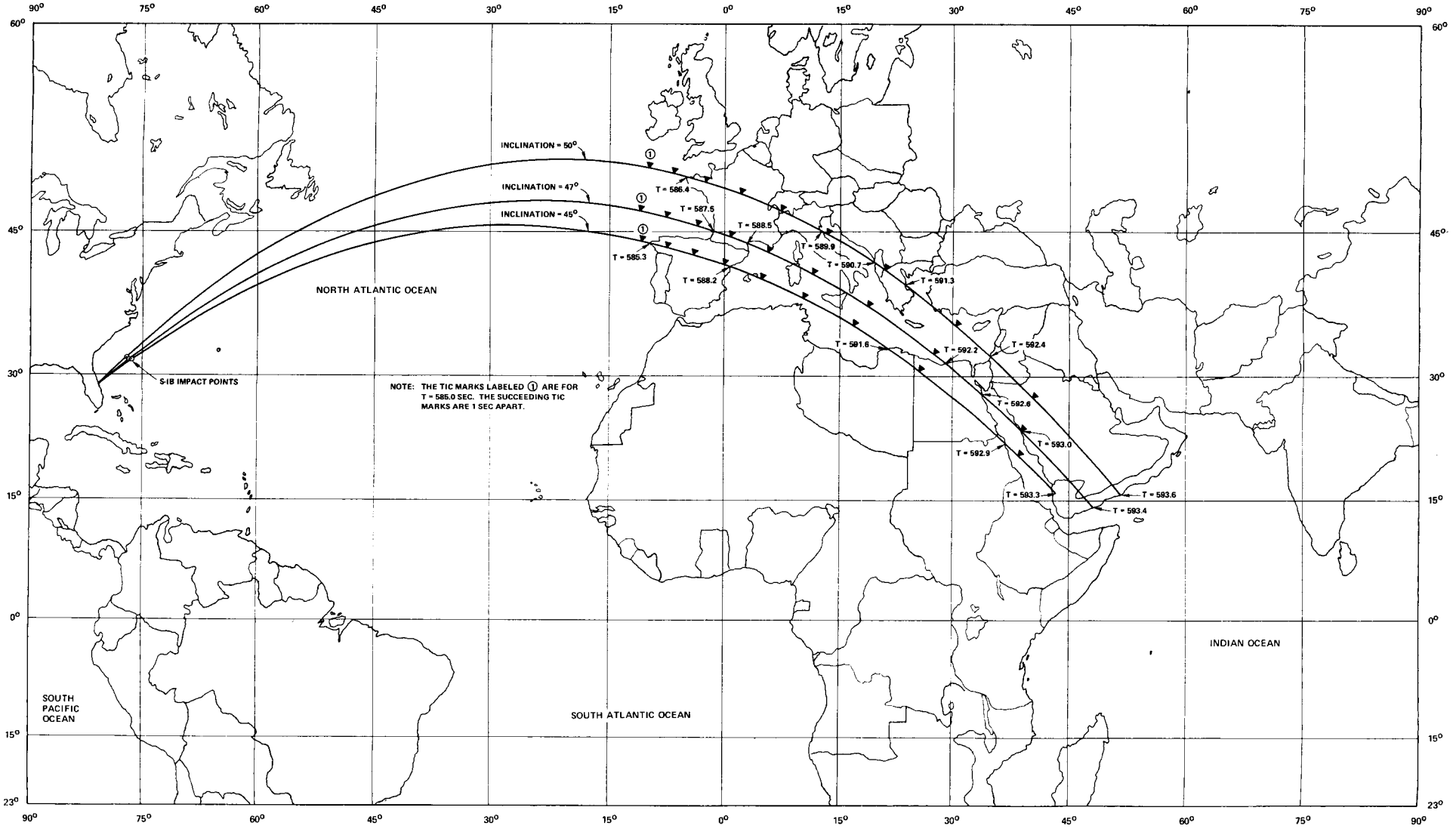

FIGURE 1. S-IB IIP CURVES FOR 45, 47, and 50 INCLINATIONS

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